PHOTOGEOLOGIC ANALYSIS OF THE MAGELLAN STEREO VIEW OF SIX CORONAE; A.T.Basilevsky[1],2 and J.W.Head[2], 1-Vernadsky Inst., Russian Academy of Sciences, Moscow 117975, Russia, abasilevsky@glasnet.ru; 2-Dept. Geol. Sci., Brown Univ., RI 02912 USA.

INTRODUCTION:The present study is one of efforts of many researches to progress in the stratigraphic context of local, regional, and global geology of coronae (see for example, [1-4,6-9]). This study is based on photogeologic analysis of several coronae selected because they were imaged by Magellan in stereo, that is very helpful in determining age sequences among the geologic units. We found in this study that we can describe the geology of coronae and their surroundings in terms of units we distinguished in our previous studies [3,4].

VERDANDI (5.5oN, 65.2oE, D = 180 km). Verdandi sits among the plains with wrinkle ridges (Pwr) embaying tessera (Tt) in the central part of Ovda regio. It is well seen in stereo that corona Verdandi is outlined by almost circular annulus standing over the surrounding Pwr plains. The corona floor is made of the same Pwr plains which is noticeably lower than the surrounding plains.Three quarters of the corona annulus are made of densely fractured terrain (COdf) with almost perfect concentric trend. Despite very close distance (5-20 km) between the corona annulus and tessera terrain no influence of the tessera structural pattern is seen in any corona element. COdf annulus is embayed from inside and outside by the Pwr plains. The wrinkle ridges that deform the Pwr plains trend mostly N-S and NE showing no alignment with the corona structure. In the SE part of the annulus there is a topographic gap filled by Pwr plains criss-crossed by the dense NE-trending fractures which are one of the branches of the Ix-Chel chasma rift zone. East of the corona several arcuate fractures concentric to corona and cutting the Pwr plains are seen. They are cut by another set of the rift-associated fractures.

THOURUS (6.5oS, 12.9oE, D = 290 km). Corona Thourus sits among plains with wrinkle ridges (Pwr). The corona annulus, which completely encircles the corona, is mostly made of densely fractured terrain (COdf) with almost perfect concentric structural pattern. It is well seen in stereo that the annulus stands over the surrounding plains and the corona interior is topographically lower than the surrounding plains.The COdf ring of the annulus is embayed by the materials of three sorts: 1) the material correlative to the fractured and ridged plains (Pfr) of [3,4], it participates in composing the annulus; 2) the material corelative to the shield plains (Psh) [4]; and the material of plains with wrinkle ridges (Pwr) which embays the corona annulus from outside and forms the dominant part of the corona interior. Pwr plains are deformed by wrinkle ridges with a predominantly E-W trend which slightly deflects to radial to the corona east and west of it. In the northern part of the corona interior there is 10x50 km area of relatively bright plains (not deformed by wrinkle ridges) correlative to the lobate plains (Pl) unit of [3,4]

BELET-ILI (6.0oN, 20.0oE, D = 300 km). This corona and neighboring corona Gaya (see below) are among the Pwr plains of the southern part of Berighinya Planitia. Belet -ili has an anulus consisting of different materials and structural features which form together the well visible quasi-circular structure: Pfr plains crossed by concentric fractures in the west, it embays a small massif of tessera terrain; Pwr plains deformed by concentric wrinkle ridges and concentric and radial fractures in the north; zigzaging wrinkle ridges in the east and concentric wrinkle ridges and inward-looking scarp in the south. The central part of Belet-ili corona is dominated by fields of numerous small shields correlative to the Psh plains. These fields are separated and embayed by the Pwr plains.

GAYA (3.5oN, 21.5oE, 350x500 km). Gaya corona is a pear shaped E-W elongated structure, sitting in the Pwr plains with subordinate Psh patches and outlined by sets of wrinkle ridges. The southern part of Gaya is outlined also by the well seen in stereo inward looking arcuate scarp. The the NW part of the Gaya annulus is simultaneously the southern part of the Belet-ili annulus. This connection looks as mutually concordant without any evidence of superposition. The SW part of the Gaya annulus is also encircled by a set of fine fractures concentric to general corona structure. The central part of corona Gaya are made of the Pwr plains with patches of densely (radially) fractured terrain (COdf) and fields of small shields (Psh) both embayed by Pwr.

ARAMAITI (26.3oS, 82.0oE, D = 350 km) and neigboring corona Ohogetsu (see below) are among the predominantly Pwr plains of Aino Planitia. In the vicinity and inside the corona there are two varieties of regional Pwr plains: the older having intermediate radar brightness (Pwr-i) and the younger which is noticeably darker (Pwr-d). The network of wrinkle ridges is superposed on both of them. Immediately east of Aramaiti there is a belt of fractured and ridged plains (Pfr) embayed by both varieties of the Pwr plains. It is well seen in stereo that at the north Aramaiti has two annulae divided by the trough and only one annulus at the south. The inner annulus of the corona north and the annulus of its south form together a spiral-like feature made of densely (concentrically) fractured terrain (COdf) which can be subdivided into two subunits: 1)COdf-a, which occupies the rimcrest of the first third of the mentioned COdf spiral, and 2) COdf-b which occupies the rest. COdf-a is more deformed, embayed by the Pwr-i plains and probably correlative to COdf/Pdf unit of [3,4]. COdf-b has a visible plain-like background

STEREO VIEW OF SIX CORONAE: A.T. Basilevsky and J.W. Head

with fine concentric lineaments and is the deformed Pwr-i plains. The SW sector of the inner annulus looks as arcuate plate of COdf-a upthrusted into SE direction (probably when the mentioned ridge belt was formed). Outer annulus of the northern part of Aramaiti is made of the Pwr-i plains cut by roughly concentric set of partly sinuous faults. The trough between the outer and inner annulae is filled with Pwr-d which embays both the faulted material of Pwr-i and the heavily deformed material of COdf-a. The corona core is a dome surrounded by the circular trough filled with Pwr-i and Pwr-d, as well as with younger radar dark flows (Pl-d). The domical core consists of Pwr-i, Psh and COdf-a materials. In the arcuate depression within the eastern segment of the annulus and outside the annulus are observed young dark plains of the type which was called by [5] as amoeboids (Pda) which are probably correlative to Pl/Ps units [3,4].

OHOGETSU (27.0oS, 85.7oE, D = 175 km). It is the corona neighboring Aramaiti so regional geologic situation for Ohogetsu is mainly same as for Aramaiti. The most important difference is that corona Aramaiti sits aside of the belt with broad compressional ridges on it, while Ohogetsu is in between two segments of the belt. Corona Ohogetsu, like corona Aramaiti, has an annulus consisting of two varieties of the densely fractured terain: 1) COdf-a, 2) COdf-b. In SW sector of Ohogetsu there is a peculiar arcuate feature. On stereo it looks as a horse-shoe plate upthrusted upon the middle part of the SW section of the annulus. From consideration of local geology it was concluded that the plate material is probably the Pfr plains whose upthrust was due to the event of regional compression which formed the belt with broad ridges. Inner part of corona Ohogetsu is occupied by dark Pwr-d plains deformed by N-S trending set of wrinkle ridges extending southward into the area of Pwr-i plains. Among the Pwr-d plains of the corona interior there is a shield of about 10 km in diameter (Psh?). Western part of corona Ohogetsu annulus is flooded by the dark plains of the amoeboid type (Pda) which embays all the materials it is in contact including the Pwr-d plains and the wrinkle ridges themselves. To SE and SW of the corona annulus there are several localities of the lobate plains correlative to the Pl unit [3,4].

DISCUSSION AND CONCLUSION: The described observations on the age relations of different components of the studied coronae can be presented in a form of the following table:

Corona	Tt	COdf/Pdf	Pfr/RB	Pwr	Pl/Ps
Verdandi	n	///////////////	?	n	n
Thourus	-	///////////////	///////////////	///////////////	///////////////
Belet-ili	n	?	///////////////	///////////////	n
Gaya	-	///////////////	?	///////////////	n
Aramaiti	-	///////////////	?	///////////////	///////////////
Ohogetsu	-	///////////////	///////////////	///////////////	///////////////

Five of considered coronae consist of several material units and structures representing a time sequence of geologic events. Only Verdandi is an example of corona outlined by structures of one age deforming only one material unit. We found no evidence of coronae predating tessera and deformed by tessera terrain structure. The first evidence of a corona structure is a formation of an annulus due to warping of early regional and global units (Pdf; Pfr) of apparent volcanic origin. Following this initial stage, most corona annulae were flooded to different extents by regional volcanic plains (Pwr with patches of Psh). Then majority of the studied coronae experienced concentric and/or radial fracturing and with a half of them was associated the emplacement of flows otside and/or inside the corona. These later volcanics are unmodified by wrinkle ridges that relates them to rather recent period of geologic history of Venus. These observations are in agreement with our earlier results [2-4] and with results of other workers[1,6-9] so the general conclusion is that coronae are characterized by both local and regional structures and stratigraphic units and that their geologic history represents the interplay of local coronae events superposed on regional and global geologic evolution. Total life time of coronae in some cases (e.g. Vernandi) may span since early post-tessera period till pre-Pwr or even pre-Pfr time, that is probably less than 100 my, while in other cases (e.g. Ohogetsu) it is significantly longer, from early post-tessera time till post-Pwr, Ps/Pl time, that may be as long as 200 to 400 my.

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